Case Study: Analysis of Environmental Monitoring for Shore Protection Projects in North Carolina

Dawn York, MS, Dial Cordy and Associates

Ryan McAllister, UNCW-Masters Candidate

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Cherry Point Environmental Conferen

Dial Cordy and Associates, Inc.

- A Local Environmental Firm
- Specialists in Marine Science, Coastal Ecology, Regulatory Affairs, and Environmental Planning
- USACE NEPA Contractor for Shore Protection and Navigation Projects for Over 20 Years

Dial Cordy and Associates Inc. has regional technical expertise and a strategic planning approach.

Beach Nourishment Locations

Beach Nourishment Strategies

Currently Allowed Strategies Consist of:

- Beach Nourishment;
- Inlet Dredging/Bypassing;
- Inlet Channel Realignment/Relocation;
- Four Terminal Groins;
- Temporary Sandbags; and
- Structure Relocation.

Primary Coastal Habitats

Water Column

Shell Bottom

Soft Bottom

Wetlands

Submerged Aquatic

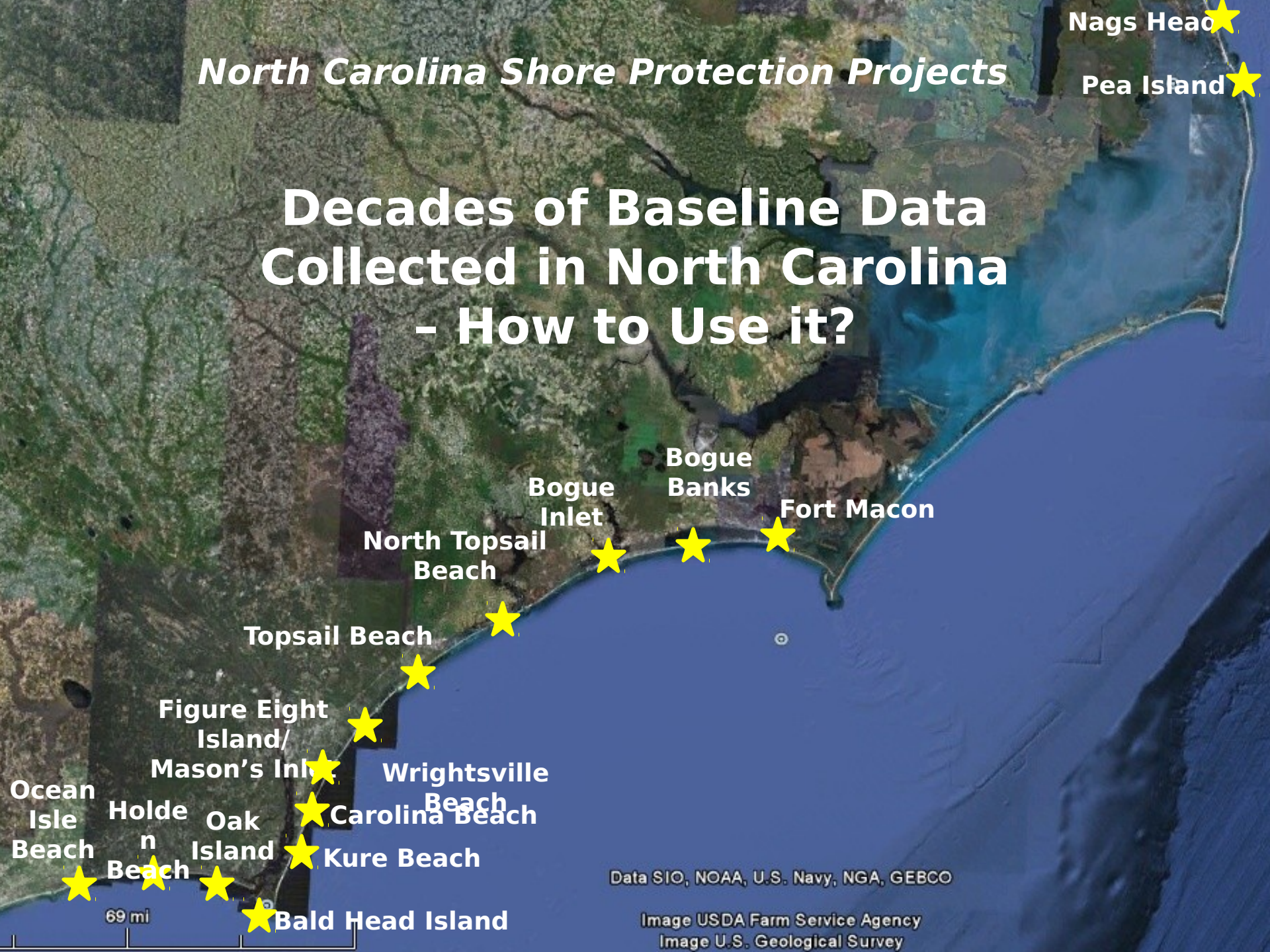
Hardbottom

Critical Components of Beach Nourishment Projects

- Match Pre-existing Beach Sands in Size
- Restrict Fill to Winter While Animals are Rare
- Avoid Proximity to Hardbottoms
- Monitor with Rigorous Science and Mitigate
- Conduct Adequate Assessment of Cumulative Impacts and Regulate Frequency
- Protect Fish/Bird/Turtle Habitat and Prey
- Enforce Turbidity Regulations and Standards

Challenges: Which Resource is Critical to Monitor?

- Every Beach Nourishment/Inlet Relocation Project Have Entailed Some Type of Baseline Assessment Including:
  - Sea Turtle Nesting Success
  - Shorebird Behavior Study
  - Benthic Infauna Composition/Density
  - Saltmarsh Growth
  - Habitat Assessment including Mapping of SAV, Oysters, and Shoal /Vegetation Features
  - Water Quality Assessment (i.e. Turbidity)
  - Fish Foraging Diet Analysis


North Carolina Shore Protection Projects
Decades of Baseline Data Collected in North Carolina – How to Use it?
Nags Head
Pea Island
Bogue Banks
Bogue Inlet
Fort Macon
North Topsail Beach
Topsail Beach
Figure Eight Island/ Mason's Inlet
Wrightsville Beach
Carolina Beach
Kure Beach
Ocean Isle Beach
Holden Beach
Oak Island
Bald Head Island
69 mi
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image USDA Farm Service Agency
Image U.S. Geological Survey

Availability of Existing Data

Challenges: Determining Impacts

Pre-Construction

- Determined Early in Process
- Match Physical Data
  - Timing; Types of Data; Source; Control Site
  - How many Pre-Construction Events?
  - Influencing Factors: Seasonality, Storms

Monitoring is a Snapshot into a Dynamic Environment

Data Identification and Acquisition

- Key Gaps Exist in the Area of Environmental Monitoring
- Additional Data Collection Should be Done to Better Understand Coastal Resources.
  - Includes Identified Data Gaps and Research in Each of the Six Coastal Habitat Types.

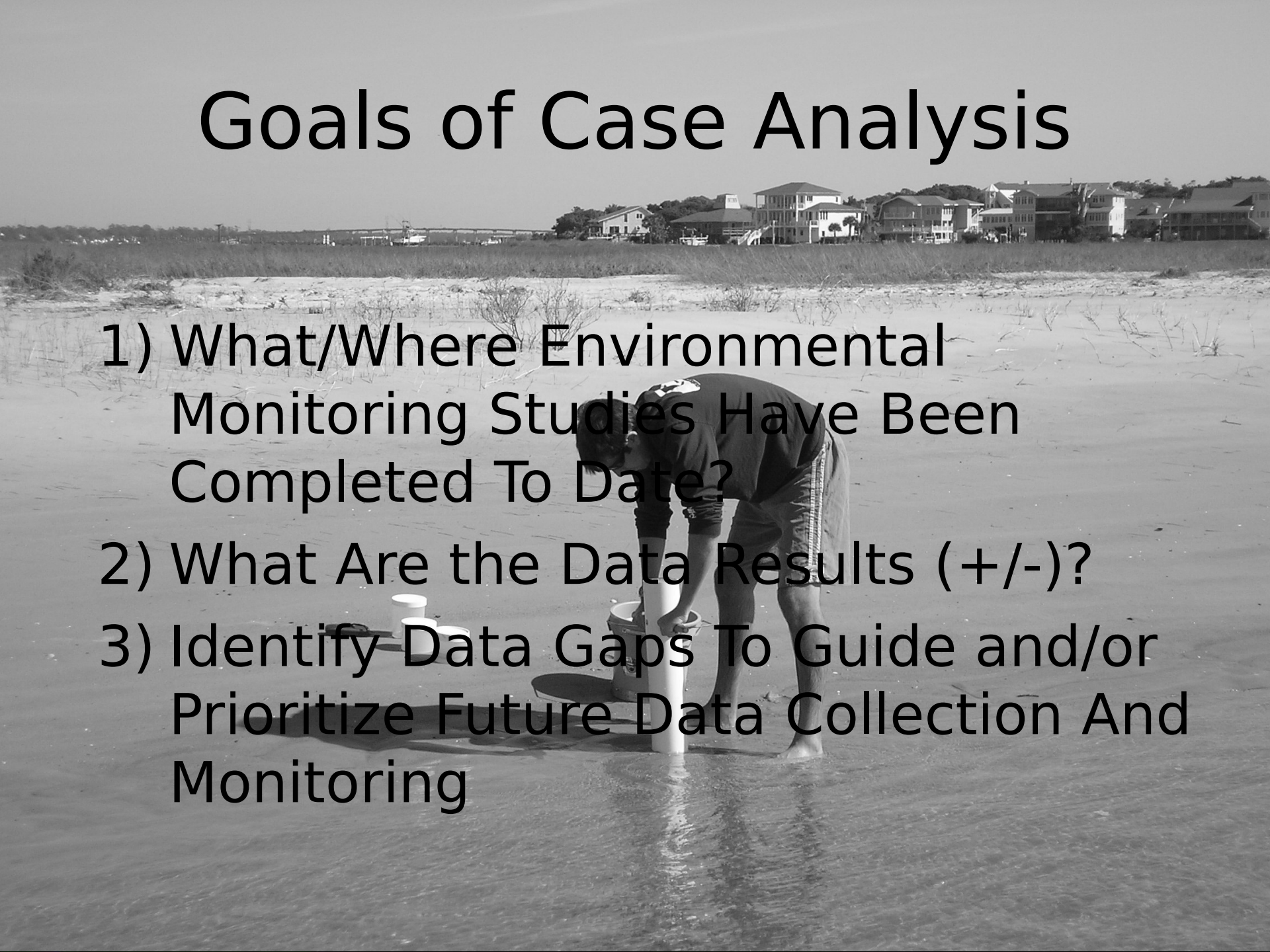
Proposed Data Gaps

- Fully evaluate the effect of new groins on coastal fisheries larval passage;
- Assess indirect impacts on SAV;
- Site specific erosion and accretion rates and their relationship to sea level rise and storm events
- Assess direct and indirect dredging impacts on blue crabs and inlet spawning species

Proposed Data Gaps cont.

- Adequate Monitoring of the Effects of Large-scale or Long-term Beach Nourishment on Soft Bottom Community; and
- Continue to Monitor Biological Recovery Rates to Adequately Assess Direct and Cumulative Impacts;
- Evaluate Status and Trends of Hard Bottom Habitat; and

Goals of Case Analysis



1) What/Where Environmental Monitoring Studies Have Been Completed To Date?
2) What Are the Data Results (+/-)?
3) Identify Data Gaps To Guide and/or Prioritize Future Data Collection And Monitoring

Critical Roles and Partnerships

Existing agency relationships will facilitate discussions with critical partners.

Proposed Technical Data Sources

- NCDCM – Permit Review/Past History
- USACE – Permit Review/Past History
- UNCW – Economic and Statistical
- NCBIWA – Economic/Past History/Local Gov’t
- USFWS – Threatened and Endangered Species
- NOAA – Essential Fish Habitat
- NCWRC – State Listed Species

Proposed Task Timeline

1) Inventory: April – May 2012

- Establish Issues and Stakeholders
- Strategic Planning
- Permit/ROD/Monitoring Report Review
- Construct Database
- Stakeholder Meetings (Input Sessions)

Proposed Task Timeline

2) Database Analysis: June - August

- Establish Evaluation Criteria
- Review of Database with Stakeholders
- Finalize Database
- Statistical Analysis

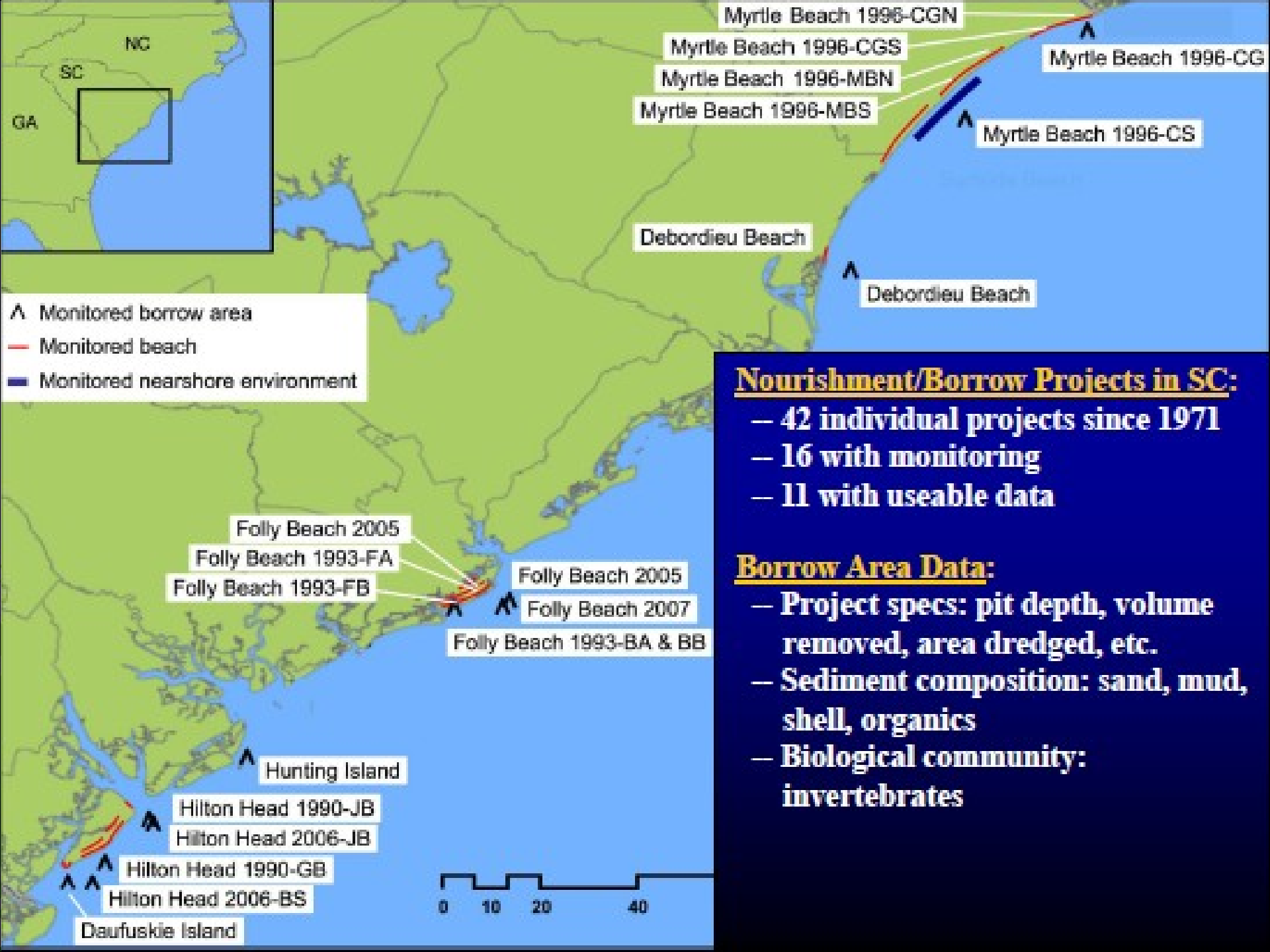
3) Reporting September - November

- Report Preparation
- Stakeholder Review Process
- Final Report

Coastal Research Consortium

- Scientific Exchange Forum
- Agencies, Municipalities, Contractors, Coastal Scientists
- Annual Basis (or every few years?)
- Proceedings Published

Meeting Research and Education Needs in Coastal Shore Protection



Nourishment/Borrow Projects in SC:

- 42 individual projects since 1971
- 16 with monitoring
- 11 with useable data

Borrow Area Data:

- Project specs: pit depth, volume removed, area dredged, etc.
- Sediment composition: sand, mud, shell, organics
- Biological community: invertebrates

Recommendations from SCDHEC

- Recommendations to Improve:
  - Monitoring Study Design;
  - Sample Collection; and
  - Data Analysis and Report Writing
- Additional Recommendations:
  - Fill Gaps in Understanding Impacts of Nearshore Dredging and Beach Nourishment.

Questions/Feedback?

Dawn York
Dial Cordy and Associates
910-251-9790
dyork@dialcordy.com